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Research area: Process aims
Pulp production // Recovered paper treatment

Key words:
Deinking, dirt specks, disperging

Title: Improving the optical quality characteristics of deinked pulp through efficient use of the process stage disperging with the aid of a new evaluation method

Background/Problem area

Demands on optical characteristics such as brightness, luminosity, chromaticity co-ordinates and cleanness are high when producing bright new papers like graphic, sanitary or facing papers from recycled fibre pulps. The cleanliness of paper is impaired by dirt specks, especially those visible to the naked eye. When using deinked pulp for improved paper grades, demands are even higher in this respect (pulps must be free from dirt specks). This requires high removal levels of ink particles from the pulp, but also additional measures in the recovered paper treatment plant to improve the optical appearance of recycled fibre pulps (optical cleanness).

Higher demands on the quality of deinked pulps, the growing use of deinked pulps for higher paper grades, but also limitations due to raw material quality (print products like UV/toner prints in recovered paper leading to dirt specks in deinked pulps) require more complex and time-consuming treatment steps. An improved efficiency of these treatment steps is desirable for economic reasons. Disperging is an indispensable process stage to improve the optical cleanliness and, thus, optical characteristics especially with regard to ink detachment and dirt particle comminution.

Objectives/Research results

The research project aims to improve the optical quality of deinked pulps through the efficient use of the process stage disperging. Creating optimum disperging conditions for the respective type and level of ink particle loading in the disperger inlet is at the forefront of project work. The results will be used to develop cost-optimised concepts to mutually adjust the disperging process and its preceding flotation stage in order to achieve the desired optical properties by means of a given raw material quality. Processes will be assessed by a new evaluation method (PTS “ink particle analysis” method) enabling the ink loading to be determined together with the size distribution of ink particles.

The research project focuses on pilot disperging trials. In order to put them into practice, an initial step involved defining the boundary conditions and performance targets regarding the operating conditions based on a study of the mill disperging plants chosen. An appropriate trial matrix was subsequently created. Trials were carried out on the pilot-scale disperging of RCF pulps containing different basic raw materials (a mixture of newspapers/magazines, a mixture of newspapers/magazines with a share of toner print) as well as different grades of ink particle loading while varying the disperging conditions. The RCF pulps were characterised before and after disperging regarding their quality properties – with special attention being paid to the particle size distribution – to determine those operating conditions that make optimal separation of printing inks possible in post-flotation and also make optimal optical homogeneity of the finished stock possible.

Application/Economic benefits

Optimum disperging leading to suitable size distributions of ink particles facilitates the ink removal by post-flotation. Improved ink detachment helps to reduce fibre losses. Deinked pulps containing low shares of residual ink ahead of the bleaching stage offer much greater potential for improvement by bleaching. This saves raw material, disposal and chemical costs. The optimisation of disperging as a single process and mutual adjustment of disperging and its preceding flotation stage permit savings especially in energy costs. Improved quality characteristics of deinked pulp help broadening the application range of deinked recycled fibre pulps. Technological optimization through improved process control of the disperging stage - especially specific adjustments to given raw materials - makes it possible to improve the quality and economic efficiency of recovered paper treatment.

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Remarks

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